



Fluor Federal Services, Inc. Paducah Deactivation Project

FACILITIES, OPERATIONS & INFRASTRUCTURE		CP4-OP-0434	
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0	Revise Blue sheeted version of procedure	All	02/17/15
1	Revision for Cell Treatment Project and Fluor format	All	07/23/15

BUILDING C-410-K ALARM RESPONSE PROCEDURES (ARPs)

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C-410-K

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REFERENCES:

1. CP4-OP-0429, *Operation of the C-410-D and C-410-K Fluorine Distribution Centers*

HIGH FLUORINE C-410-K CANOPY COVERED AREA
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INITIATING DEVICE: Fluorine Detector Head in C-410-K canopy covered area (YT-106) **SETPOINT:** 0.5 ppm
AUTOMATIC ACTIONS: C-410-K outside beacon/outside alarm activated. **RESET:** 0.45 ppm

IMMEDIATE ACTIONS
<p>WARNING:</p> <p>IF a release is observed, THEN See and Flee takes precedence over any mitigative actions listed below.</p>
<ol style="list-style-type: none">1. EVACUATE C-410-K canopy covered area.2. IF major release/fire is underway, THEN EVACUATE the area.3. IF in C-410-K, THEN ACKNOWLEDGE detection alarm.4. ATTEMPT to determine the source of any release.
<p>WARNING:</p> <p>C-410-K should be isolated upstream of C-410 Emergency Isolation Valve FFV-7 at valve FFV-14 or FFV-11 before isolating C-410-D to prevent potentially challenging the over pressure protection system in C-410-K as regulators contained in C-410-K are sensitive to both pressure and flows.</p>
<ol style="list-style-type: none">5. IF passivation from C-410-D and system leakage is confirmed, THEN ATTEMPT to isolate feed from C-410-D by closing FFV-14 or FFV-11 before isolating C-410-D systems.6. IF alarm is due to an obvious fluorine leak/fire and tube truck is aligned to C-410-K, THEN:<ol style="list-style-type: none">6.1 ISOLATE tube truck from C-410-K by isolating feed at the tube truck Main Isolation Valve.
<p>NOTE:</p> <p>The remote operator switch in C-400 must be held in the desired position until valve travel is complete.</p>
<ol style="list-style-type: none">6.2 AFTER C-410-K feed has been isolated, CLOSE valve Emergency Isolation Valve FFV-7 from C-400.7. ATTEMPT to isolate source of leakage.8. NOTIFY the Plant Shift Superintendent if a fluorine release is confirmed.

HIGH FLUORINE C-410-K CANOPY COVERED AREA

SUPPLEMENTARY ACTIONS

- 1. NOTIFY FLM.
- 2. MONITOR alarm status and fluorine levels.
- 3. **IF** a release is not in progress and fluorine detector level drops below setpoint, **THEN** RESUME normal operations, at the direction of the FLM.
- 4. **IF** E-Squad has been called out, **THEN** WAIT for “all clear” announcement before reentering C-410 Facilities
- 5. **IF** C-410-K is isolated from C-410-D, **THEN** ISOLATE the fluorine system upstream of primary pressure reducing regulator

POSSIBLE CAUSES:

- 1.0 Fluorine level under the canopy has increased due to piping system leak
- 2.0 False alarm — detector malfunction

**HIGH FLUORINE
C-410-D**

INITIATING DEVICE: Fluorine Detector Head in C-410-D (YT-88)
AUTOMATIC ACTIONS: C-410-D outside beacon/outside alarm activated.

SETPOINT: 0.5 ppm
RESET: 0.45 ppm

IMMEDIATE ACTIONS	
<div style="border: 2px solid black; padding: 5px; margin-bottom: 10px;"> <p>WARNING:</p> <p>IF a release is observed, THEN See and Flee takes precedence over any mitigative actions listed below.</p> </div>	
<ol style="list-style-type: none"> 1. EVACUATE C-410-D. 2. IF major release/fire is underway, THEN EVACUATE the area. 3. IF in C-410K, THEN ACKNOWLEDGE detection alarm. 4. ATTEMPT to determine the source of any release. 	
<div style="border: 2px solid black; padding: 5px; margin-bottom: 10px;"> <p>WARNING:</p> <p>C-410-K should be isolated upstream of C-410 Emergency Isolation Valve FFV-7 at valve FFV-14 or tube truck Main Isolation Valve before isolating C-410-D to prevent potentially challenging the over pressure protection system in C-410-K as regulators contained in C-410-K are sensitive to both pressure and flows.</p> </div>	
<ol style="list-style-type: none"> 5. IF feeding from C-410-K and system leakage is confirmed, THEN ATTEMPT to isolate feed from C-410- K by closing FFV-14 or tube truck Main Isolation Valve before isolating C-410-D systems. 6. ATTEMPT to isolate source of leakage. 7. NOTIFY the Plant Shift Superintendent if a fluorine release is confirmed. 	
SUPPLEMENTARY ACTIONS	
<ol style="list-style-type: none"> 1. NOTIFY FLM. 2. MONITOR alarm status and fluorine levels. 3. IF a release is not in progress and fluorine detector level drops below setpoint, THEN RESUME normal operations, at the direction of the FLM. 4. IF E-Squad has been called out, THEN WAIT for “all clear” announcement before reentering C-410-D 5. IF C-410-K is isolated from C-410-D, THEN also ISOLATE the fluorine system upstream of primary pressure reducing regulator. 	

POSSIBLE CAUSES:

- 1.0 Fluorine level in building has increased due to a tank or piping system leak
- 2.0 False alarm — detector malfunction

C-410-K

ALARM YAH-89

**HIGH FLUORINE
C-410-K**

INITIATING DEVICE: Fluorine Detector Head in C-410-K (YT-89)
AUTOMATIC ACTIONS: C-410-K outside beacon/outside alarm activated.

SETPOINT: 0.5 ppm
RESET: 0.45 ppm

IMMEDIATE ACTIONS

WARNING:

IF a release is observed, **THEN** See and Flee takes precedence over any mitigative actions listed below.

1. EVACUATE C-410-K.
2. **IF** a major release/fire is underway, **THEN** EVACUATE the area.

WARNING:

C-410-K should be isolated upstream of C-410 Emergency Isolation Valve FFV-7 at the tube truck Main Isolation Valve **before** isolating C-410-D to prevent potentially challenging the over pressure protection system in C-410-K as regulators contained in C-410-K are sensitive to both pressure and flows.

3. **IF** alarm is due to an obvious fluorine leak/fire **and** tube truck is aligned to C-410-K, **THEN**:
 - 3.1. ISOLATE tube truck from C-410-K by isolating feed at the tube truck Main Isolation Valve.

NOTE:

The remote operator switch in C-400 must be held in the desired position until valve travel is complete.

- 3.2. **AFTER** C-410-K feed has been isolated, CLOSE valve Emergency Isolation Valve FFV-7 from C-400.
4. **IF** a fluorine release is confirmed, **THEN** NOTIFY the Plant Shift Superintendent.

SUPPLEMENTARY ACTIONS

1. NOTIFY FLM.
2. **IF** possible, **THEN** MONITOR alarm status and fluorine levels.
3. **IF** a release is **not** in progress and fluorine detector level drops below setpoint, **THEN** RESUME normal operations at the direction of the FLM.
4. **IF** E-Squad has been called out, **THEN** WAIT for “all clear” announcement **before** reentering C-410-K.

POSSIBLE CAUSE:

- 1.0 Fluorine level in building has increased due to a leak
- 2.0 False alarm — detector malfunction

**HIGH FLUORINE PRIMARY
REGULATOR CABINET**

INITIATING DEVICE: Fluorine Detector Head in Exhaust Duct (YT-100)
AUTOMATIC ACTIONS: PV-104A Closure
C-410-K outside beacon/outside alarm activated

SETPOINT: 0.5 ppm
RESET: 0.45 ppm

IMMEDIATE ACTIONS

WARNING:
IF a release is observed, **THEN** See and Flee takes precedence over any mitigative actions listed below.

- 1. **IF** alarm is due to a fluorine leak, **THEN** CLOSE tube truck Main Isolation Valve.

NOTE:
PV-104A position can be verified from remote monitoring stations. (Red is open, Green is closed)

- 2. CHECK PV-104A has closed. (Status can be checked at remote monitoring station in C-300 or C-400)
- 3. ACKNOWLEDGE detection alarm.

WARNING:
C-410-K should be isolated upstream of C-410 Emergency Isolation Valve FFV-7 at the tube truck Main Isolation Valve **before** isolating C-410-D to prevent potentially challenging the over pressure protection system in C-410-K as regulators contained in C-410-K are sensitive to both pressure and flows.

- 4. **IF** alarm is due to a fluorine leak and tube truck Main Isolation Valve is closed, **THEN:**
 - ENSURE C-410 Emergency Isolation Valve FFV-7 is closed from C-400.
- 5. MONITOR fluorine detection levels.

SUPPLEMENTARY ACTIONS

- 1. NOTIFY FLM.
- 2. DETERMINE cause of the alarm.
- 3. MONITOR pressure downstream **AND** CLOSE additional valves as directed by the FLM or PSS.
- 4. RE-ESTABLISH normal system conditions using CP4-OP-0429, *Operation of the C-410-D and C-410-K Fluorine Distribution Centers* at the direction of the FLM.

POSSIBLE CAUSES:

- 1.0 Fluorine level in exhaust has increased due to a system leak in or around the regulator cabinet.
- 2.0 False alarm — detector malfunction.

C-410-K

ALARM YAH-101

HIGH FLUORINE SOUTH (101) SECONDARY REGULATOR CABINET
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INITIATING DEVICE: Fluorine Detector Head (YT-101)

SETPOINT: 1.8 ppm

AUTOMATIC ACTIONS: Closure of PV-101

RESET: 1.35 ppm

C-410-D outside beacon/outside alarm activated

IMMEDIATE ACTIONS

WARNING:

IF a release is observed, **THEN** See and Flee takes precedence over any mitigative actions listed below.

- IF** alarm is due to fluorine leak, **THEN** ISOLATE C-410-K by ensuring FFV-14 is closed.
- IF** alarm is due to fluorine leak, **THEN** ISOLATE C-410-D feed by ensuring the following valves are close:
 - ENSURE valve FDV-2A is closed.
 - ENSURE valve FDV-2B is closed.
 - ENSURE valve FDV-2C is closed.
 - ENSURE valve FFV-5A is closed.
 - ENSURE valve FFV-5B is closed.
 - ENSURE valve FFV-5C is closed.
- CHECK valve PV-101 has closed. (Intended status can be checked at remote monitoring station in C-300 or C-400)
- ACKNOWLEDGE trouble alarm.
- IF** alarm is due to a fluorine leak **AND** levels inside C-410-D have stabilized, **THEN** CLOSE the following valves:
 - FDV-10 is closed
 - FDV-11 is closed.

SUPPLEMENTARY ACTIONS

- NOTIFY FLM.
- MONITOR fluorine system pressures and detection levels.
- DETERMINE the cause of the alarm.
- RE-ESTABLISH normal system conditions using CP4-OP-0429, *Operation of the C-410-D and C-410-K Fluorine Distribution Centers* at the direction of the FLM.

POSSIBLE CAUSES:

- 1.0 System leak
- 2.0 Alarm malfunction

HIGH FLUORINE NORTH (103) SECONDARY REGULATOR CABINET
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INITIATING DEVICE: Fluorine Detector Head (YT-103)

SETPOINT: 1.8 ppm

AUTOMATIC ACTIONS: Closure of PV-103

RESET: 1.35 ppm

C-410-D outside beacon/outside alarm activated

IMMEDIATE ACTIONS

WARNING:

IF a release is observed, **THEN** See and Flee takes precedence over any mitigative actions listed below.

1. **IF** alarm is due to fluorine leak, **THEN** ISOLATE C-410-K by ensuring FFV-14 is closed.
2. **IF** alarm is due to fluorine leak, **THEN** ISOLATE C-410-D feed by ensuring the following valves are closed.
 - ENSURE valve FDV-2A is closed.
 - ENSURE valve FDV-2B is closed.
 - ENSURE valve FDV-2C is closed.
 - ENSURE valve FFV-5A is closed.
 - ENSURE valve FFV-5B is closed.
 - ENSURE valve FFV-5C is closed.
3. CHECK valve PV-103 has closed. (Intended status can be checked at remote monitoring stations in C-300 or C-400)
4. ACKNOWLEDGE trouble alarm.
5. **IF** alarm is due to fluorine leak **AND** levels inside C-410-D have stabilized, **THEN** CLOSE the following valves:
 - FDV-7 is closed
 - FDV-8 is closed.

SUPPLEMENTARY ACTIONS

1. NOTIFY FLM.
2. MONITOR fluorine system pressures and detection levels.
3. DETERMINE the cause of the alarm.
4. RE-ESTABLISH normal system conditions using CP4-OP-0429, *Operation of the C-410-D and C-410-K Fluorine Distribution Centers* at the direction of the FLM.

POSSIBLE CAUSES:

- 1.0 System leak
- 2.0 Alarm malfunction

LOW PRESSURE TANK FE 357-A

INITIATING DEVICE: Tank FE 357-A Pressure Transmitter (PT-85)
AUTOMATIC ACTIONS: None

SETPOINT: 17.5 ± 2.5 psia
RESET: 18 psia

IMMEDIATE ACTIONS	
1.	ACKNOWLEDGE trouble alarm.
2.	IF due to rupture disk failure, THEN :
2.1.	ISOLATE the affected tank.
2.2.	NOTIFY Plant Shift Superintendent of release.
SUPPLEMENTARY ACTIONS	
1.	NOTIFY FLM.
2.	RE-ESTABLISH normal tank pressure using CP4-OP-0429, <i>Operation of the C-410-D and C-410-K Fluorine Distribution Centers</i> at the direction of the FLM.

POSSIBLE CAUSES:

- 1.0 Low inventory in tank
- 2.0 Loss of rupture disk on isolated tank

LOW PRESSURE TANK FE 357-B

INITIATING DEVICE: Tank FE 357-B Pressure Transmitter (PT-86)
AUTOMATIC ACTIONS: None

SETPOINT: 17.5 ± 2.5 psia
RESET: 18 psia

IMMEDIATE ACTIONS	
1.	ACKNOWLEDGE trouble alarm.
2.	<u>IF</u> due to rupture disk failure, <u>THEN</u> :
2.1.	ISOLATE the affected tank.
2.2.	NOTIFY the Plant Shift Superintendent of the release.
SUPPLEMENTARY ACTIONS	
1.	NOTIFY first-line management.
2.	RE-ESTABLISH normal tank pressure using CP4-OP-0429, <i>Operation of the C-410-D and C-410-K Fluorine Distribution Centers</i> at the direction of the FLM.

POSSIBLE CAUSES:

- 1.0 Low inventory in tank
- 2.0 Loss of rupture disk on isolated tank

LOW PRESSURE TANK FE 357-C

INITIATING DEVICE: Tank FE 357-C Pressure Transmitter (PT-87)
AUTOMATIC ACTIONS: None

SETPOINT: 17.5 ± 2.5psia
RESET: 18 psia

IMMEDIATE ACTIONS	
1.	ACKNOWLEDGE trouble alarm.
2.	<u>IF</u> due to rupture disk failure, <u>THEN</u> :
2.1.	ISOLATE the affected tank.
2.2.	NOTIFY the Plant Shift Superintendent of the release.
SUPPLEMENTARY ACTIONS	
1.	NOTIFY FLM.
2.	RE-ESTABLISH normal tank pressure using CP4-OP-0429, <i>Operation of the C-410-D and C-410-K Fluorine Distribution Centers</i> at the direction of the FLM.

POSSIBLE CAUSES:

- 1.0 Low inventory in tank
- 2.0 Loss of rupture disk on isolated tank

**HIGH PRESSURE
TANK FE 357-A**

INITIATING DEVICE: Tank FE 357-A Pressure Transmitter (PT-85) **SETPOINT:** 148 ± 2.5 psia
AUTOMATIC ACTIONS: None. **RESET:** 147.5 psia

IMMEDIATE ACTIONS
<p>1. ACKNOWLEDGE trouble alarm.</p> <div style="border: 1px solid black; padding: 5px; margin: 5px 0;"> <p>NOTE: Tank rupture disk is designed to release between 176 and 184 psia (161 to 169 psig).</p> </div> <p>2. IF supplying fluorine from C-410-K to tank, THEN CLOSE FFV-14.</p> <p>3. IF tank rupture disk has opened and tank is venting, THEN:</p> <ul style="list-style-type: none"> • ISOLATE tank from fluorine supply by ensuring the following valves are closed: <ul style="list-style-type: none"> – FFV-5A – FDV-2A • WHEN pressure is below 175 psia (160 psig), ISOLATE tank from vent stack by ensuring the following valves are closed: <ul style="list-style-type: none"> – FVV-3A – FVV-4A • NOTIFY the PSS. <p>4. ENSURE fluorine feed to tank is isolated.</p>
SUPPLEMENTARY ACTIONS
<p>1. NOTIFY FLM.</p> <p>2. DETERMINE the cause of the alarm.</p> <p>3. IF alarm actuated as a result of increase in ambient temperature of an isolated tank or upset condition, THEN ALIGN storage tank discharge valve to available lower pressure sources (including the tube truck) or to the header and relieve excess pressure according to CP4-OP-0429, <i>Operation of the C-410-D and C-410-K Fluorine Distribution Centers</i> at the direction of the FLM.</p> <p>4. IF alarm was due to primary reducing station control failure, THEN ATTEMPT to establish normal conditions according to CP4-OP-0429, <i>Operation of the C-410-D and C-410-K Fluorine Distribution Centers</i> at the direction of the FLM.</p>

POSSIBLE CAUSES:

- 1.0 Overfeed from C-410K by improperly adjusted primary regulator.
- 2.0 Ambient temperature change.
- 3.0 Primary reducing station control failure

**HIGH PRESSURE
TANK FE 357-B**

INITIATING DEVICE: Tank FE 357-B Pressure Transmitter (PT-86)
AUTOMATIC ACTIONS: None.

SETPOINT: 148 ± 2.5 psia
RESET: 147.5 psia

IMMEDIATE ACTIONS
<p>1. ACKNOWLEDGE trouble alarm.</p> <div style="border: 1px solid black; padding: 5px; margin: 5px 0;"> <p>NOTE Tank rupture disk is designed to release between 176 and 184 psia (161 to 169 psig).</p> </div> <p>2. IF supplying fluorine from C-410-K to tank, THEN ENSURE valve FFV-14 is closed.</p> <p>3. IF tank rupture disk has opened and tank is venting, THEN:</p> <ul style="list-style-type: none"> • ISOLATE tank from fluorine supply by ensuring the following valves are closed: <ul style="list-style-type: none"> • FFV-5B • FDV-2B • WHEN pressure is below 175 psia (160 psig), ISOLATE tank from vent stack by ensuring the following valves are closed: <ul style="list-style-type: none"> • FVV-3B • FVV-4B • NOTIFY the PSS. <p>4. ENSURE fluorine feed to tank is isolated.</p>
SUPPLEMENTARY ACTIONS
<p>1. NOTIFY FLM.</p> <p>2. DETERMINE the cause of the alarm.</p> <p>3. IF alarm actuated as a result of increase in ambient temperature of an isolated tank or upset conditions, THEN ALIGN storage tank discharge valve to available lower pressure sources (including the tube truck) or to the header and relieve excess pressure according to CP4-OP-0429, "Operation of the C-410-D and C-410-K Fluorine Distribution Centers" at the direction of the FLM.</p> <p>4. IF alarm was due to primary reducing station control failure, THEN ATTEMPT to establish normal conditions according to CP4-OP-0429, "Operation of the C-410-D and C-410-K Fluorine Distribution Centers" at the direction of the FLM.</p>

POSSIBLE CAUSES:

- 1.0 Overfeed from C-410K by improperly adjusted primary regulator
- 2.0 Ambient temperature change
- 3.0 Primary reducing station control failure

**HIGH PRESSURE
TANK FE 357-C**

INITIATING DEVICE: Tank FE 357-C Pressure Transmitter (PT-87)
AUTOMATIC ACTIONS: None.

SETPOINT: 148 ± 2.5 psia
RESET: 147.5 psia

IMMEDIATE ACTIONS

1. ACKNOWLEDGE trouble alarm.

NOTE
 Tank rupture disk is designed to release between **176 and 184 psia (161 to 169 psig)**.

2. **IF** supplying fluorine from C-410 to tank, **THEN** ENSURE valve FFV-14 is closed.
3. **IF** tank rupture disk has opened and tank is venting, **THEN**:
 - ISOLATE tank from fluorine supply by ensuring the following valves are closed:
 - FFV-5C
 - FDV-2C
 - **WHEN** pressure is **below 175 psia (160 psig)**, ISOLATE tank from vent stack by ensuring the following valves are closed:
 - FVV-3C
 - FVV-4C
 - **WHEN** pressure is **below 165 psig**, ISOLATE tank from vent stack.
 - NOTIFY the PSS.
4. ENSURE fluorine feed to tank is isolated.

SUPPLEMENTARY ACTIONS

1. NOTIFY FLM.
2. DETERMINE the cause of the alarm.
3. **IF** alarm actuated as a result of increase in ambient temperature of an isolated tank or upset conditions, **THEN** ALIGN storage tank discharge valve to available lower pressure sources (including the tube truck) or to the header **and** relieve excess pressure according to CP4-OP-0429, *Operation of the C-410-D and C-410-K Fluorine Distribution Centers* at the direction of the FLM.
4. **IF** alarm was due to primary reducing station control failure, **THEN** ATTEMPT to establish normal conditions according to CP4-OP-0429, *Operation of the C-410-D and C-410-K Fluorine Distribution Centers* at the direction of the FLM.

POSSIBLE CAUSES:

- 1.0 Overfeed from C-410K by improperly adjusted primary regulator.
- 2.0 Ambient temperature change.
- 3.0 Primary reducing station control failure

C-410-K

ALARM PAL-104A

PRIMARY REGULATOR INLET PRESSURE LOW

INITIATING DEVICE: Fluorine Header Pressure Transmitter (PT-104A/PT-104C)

SETPOINT:

1. **Upstream pressure lower than downstream**
PT-104C \geq 35 psia above PT-104A.
2. **Rapid decrease in pressure** 200 psi/ minute decrease upstream of primary manifold.

AUTOMATIC ACTIONS: Closure of PV-104A

RESET:

1. PT-104C < 0.5 psia above PT104A
2. <200 psi/minute

IMMEDIATE ACTIONS		
1.	IF major release or fire is underway, THEN EVACUATE the area and notify the PSS and FLM.	
2.	IF alarm is due to system leak, THEN CLOSE valve FFV-14.	
3.	CHECK closure of PV-104A. (Status can be checked at remote monitoring station in C-300 or C-400)	
4.	ACKNOWLEDGE trouble alarm.	
5.	DETERMINE cause of low upstream pressure.	
<table border="1"><tr><td>WARNING: C-410-K should be isolated upstream of C-410 Emergency Isolation Valve FFV-7 at the tube truck Main Isolation Valve before isolating C-410-D to prevent potentially challenging the over pressure protection system in C-410-K as regulators contained in C-410-K are sensitive to both pressure and flows.</td></tr></table>		WARNING: C-410-K should be isolated upstream of C-410 Emergency Isolation Valve FFV-7 at the tube truck Main Isolation Valve before isolating C-410-D to prevent potentially challenging the over pressure protection system in C-410-K as regulators contained in C-410-K are sensitive to both pressure and flows.
WARNING: C-410-K should be isolated upstream of C-410 Emergency Isolation Valve FFV-7 at the tube truck Main Isolation Valve before isolating C-410-D to prevent potentially challenging the over pressure protection system in C-410-K as regulators contained in C-410-K are sensitive to both pressure and flows.		
6.	IF low pressure is due to system leak, THEN ATTEMPT to isolate the leaking section of the system.	
<table border="1"><tr><td>WARNING: Isolating a failed pigtail should be performed by the Emergency Squad as levels could be elevated.</td></tr></table>		WARNING: Isolating a failed pigtail should be performed by the Emergency Squad as levels could be elevated.
WARNING: Isolating a failed pigtail should be performed by the Emergency Squad as levels could be elevated.		
7.	IF tube truck pigtail has failed, THEN ISOLATE at the tube truck Main Isolation Valve or at the individual tube valve indicating "In-Service" status.	
SUPPLEMENTARY ACTIONS		
1.	NOTIFY FLM.	
2.	IF E-Squad has been called out, THEN WAIT for "all clear" announcement before reentering C-410-K area.	
3.	IF due to valving in a low pressure tube(s), THEN ALLOW pressure to equalize and resume normal operations.	
4.	RE-ESTABLISH normal system conditions according to CP4-OP-0429, <i>Operation of the C-410-D and C-410-K Fluorine Distribution Centers</i> at the direction of the FLM.	

POSSIBLE CAUSES:

- 1.0 Supply isolated
- 2.0 System leak
- 3.0 Low tube pressure
- 4.0 System evacuation/purge

**HIGH PRESSURE DOWNSTREAM
FROM PRIMARY MANIFOLD**

INITIATING DEVICE: Primary Manifold Pressure Transmitter (PT-104C)
AUTOMATIC ACTIONS: Closure of PV-104A

SETPOINT: 148± 2.5 psia
RESET: 147.5 psia

IMMEDIATE ACTIONS	
1.	CLOSE valve FFV-14.
2.	CHECK closure of PV-104A. (Status can be checked at remote monitoring station in C-300 or C-400)
3.	ACKNOWLEDGE trouble alarm.
4.	ENSURE pressure condition has stabilized.

SUPPLEMENTARY ACTIONS	
1.	NOTIFY FLM.
2.	ALIGN system to available lower pressure sources.
3.	RE-ESTABLISH normal system conditions according to CP4-OP-0429, <i>Operation of the C-410-D and C-410-K Fluorine Distribution Centers</i> at the direction of the FLM.

POSSIBLE CAUSES:

- 1.0 Regulator malfunction
- 2.0 Regulator incorrectly set/adjusted
- 3.0 PV-104B control failure

**HIGH PRESSURE
F₂ HEADER**

INITIATING DEVICE: Fluorine Header Pressure Transmitter (PT-98A) **SETPOINT:** 22.7 ± 0.46 psia
AUTOMATIC ACTIONS: Light and audible alarm **RESET:** 20.2 psia

INITIATING DEVICE: Fluorine Header Pressure Transmitter (PT-101 or 103) **SETPOINT:** 24.7 ± 0.6 psia
AUTOMATIC ACTIONS: Audible alarm and closure of in-service secondary station automatic isolation valve (PV-101 or PV-103). **RESET:** 24.2 psia

IMMEDIATE ACTIONS
<p>1. IF manning the facility, THEN ACKNOWLEDGE trouble alarm.</p> <div style="border: 1px solid black; padding: 5px; margin: 5px 0;"> <p>NOTE: If pressure continues to increase an additional alarm will sound at 24.7 psia</p> </div> <p>2. IF additional alarm sounds at 24.7 psia on the in-service secondary station, THEN CHECK in-service automatic isolation valve closed (PV-101 or PV-103).</p> <p>3. ISOLATE 410-K by ensuring FFV-14 is closed.</p> <p>4. ISOLATE in-service secondary reducing station by ensuring the following valves are closed:</p> <ul style="list-style-type: none"> • FDV-7 • FDV-8 • FDV-10 • FDV-11
SUPPLEMENTARY ACTIONS
<p>1. NOTIFY FLM.</p> <p>2. DETERMINE cause of alarm.</p> <p>3. ISOLATE fluorine supply to primary and secondary regulatory stations as necessary to prevent over pressure condition.</p> <p>4. RE-ESTABLISH normal system conditions according to CP4-OP-0429, <i>Operation of the C-410-D and C-410-K Fluorine Distribution Centers</i> at the direction of the FLM.</p>

POSSIBLE CAUSES:
 Over pressurization of the fluorine header lines by incorrect regulator setting.
 Regulator failure.

- 1.0 Both by-pass valves open/leaking.
- 2.0 Nitrogen valved into fluorine evacuation header in C-410D.
- 3.0 Backpressure from the cascade.
- 4.0 Rise in header pressure due to increase in ambient temperature.
- 5.0 Isolated header.

**LOW PRESSURE
F₂ HEADER**

INITIATING DEVICE: Fluorine Header Pressure Transmitter (PT-98A) **SETPOINT:** 15 ± 0.46 psia
AUTOMATIC ACTIONS: None **RESET:** 17 psia

IMMEDIATE ACTIONS	
	<p>NOTE</p> <p>Low pressure F2 Header alarm will clear without a manually acknowledging the alarm when the header reaches the reset pressure indicated above.</p>
<ol style="list-style-type: none"> 1. IF manning the facility, THEN ACKNOWLEDGE trouble alarm. 2. IF alarm is due to system leak, THEN ISOLATE system by performing the following: <ol style="list-style-type: none"> A. ENSURE the following valves are closed: <ul style="list-style-type: none"> • FFV-14 • FDV-7 • FDV-10 B. NOTIFY PSS. C. ISOLATE all fluorine systems according to CP4-OP-0429, <i>Operation of the C-410-D and C-410-K Fluorine Distribution Centers</i>. 	
SUPPLEMENTARY ACTIONS	
<ol style="list-style-type: none"> 1. DETERMINE cause of alarm. 2. IF alarm is due to heeling or temporary high demand, THEN ENSURE header pressure returns to normal when feed and/or demand returns to normal. 3. NOTIFY FLM if conditions do not return to normal. 4. RE-ESTABLISH normal system conditions according to CP4-OP-0429, <i>Operation of the C-410-D and C-410-K Fluorine Distribution Centers</i> at the direction of the FLM. 	

POSSIBLE CAUSES:

- 1.0 Isolated feed supply
- 2.0 System leak
- 3.0 Low supply pressure
- 4.0 Demand exceeds supply capacity

C-410-K

ALARM YA-90B

DC POWER SUPPLY FAILURE

INITIATING DEVICE: Programmable Logic Controller (XC-90)
AUTOMATIC ACTIONS: None

SETPOINT: < 10 VDC
RESET: 10 VDC

IMMEDIATE ACTIONS
<ol style="list-style-type: none">1. ATTEMPT to acknowledge alarm.2. ISOLATE fluorine feed to primary pressure reducing station regulators in C-410-K using manual block valves.3. ISOLATE fluorine feed to secondary pressure reducing stations in C-410-D using manual block valves.
SUPPLEMENTARY ACTIONS
<ol style="list-style-type: none">1. <u>IF</u> total AC power loss causes alarm, <u>THEN</u> ENSURE feed is manually isolated from the primary pressure reducing station regulator in C-410-K, secondary pressure regulators in C-410-D, <u>AND</u> EVACUATE to C-400 <u>AND</u> OBTAIN permission from the PSS before re-entering.2. NOTIFY first-line management of alarm actuation.

POSSIBLE CAUSES:

- 1.0 Blown fuse
- 2.0 Loss of AC feed
- 3.0 Electrical malfunction

HIGH O₂ IN N₂ HEADER

INITIATING DEVICE: Thermox II Ametek
AUTOMATIC ACTIONS: None

SETPOINT: 5,000 ppm
RESET: <5,000 ppm

IMMEDIATE ACTIONS	
1.	ACKNOWLEDGE trouble alarm.
2.	IF due to wet air or oxygen in nitrogen system, THEN DO NOT EXPOSE additional system components to nitrogen until cause of the alarm is corrected.
SUPPLEMENTARY ACTIONS	
1.	NOTIFY FLM of alarm actuation.
2.	WHEN alarm cause is determined, and issue corrected as necessary, at FLM direction RESUME normal operations when O ₂ levels are below reset point.

POSSIBLE CAUSES:

- 1.0 Loss of N₂ pressure
- 2.0 System maintenance
- 3.0 Crossover of O₂ into N₂ header